

CLIMATOLOGICAL DATA FOR OCTOBER, 1912.

DISTRICT No. 4, THE LAKE REGION.

J. H. ARMINGTON, Acting District Editor.

GENERAL SUMMARY.

The month in the Lake region was, except for a few brief periods, one of pleasant weather conditions. Mean temperatures were generally above the seasonal average, and while in many localities the diurnal oscillation attained a considerable amplitude, no unusual extremes occurred. Over the larger portion of the district the month was marked by less than the normal October precipitation, but in the southwestern and extreme eastern sections wetter conditions were the rule. Relative humidity, which had been unusually high during July, August, and September, was generally below the seasonal mean, while clear days with abundant sunshine were of more than ordinary frequency in practically all portions of the district.

Destructive storms were few in number, although the disturbance which crossed the lakes on the 11-12th was accompanied by southwest to west gales. Thunderstorms in connection with this disturbance caused some damage by wind and lightning in the southern and central counties of Lower Michigan, and a few lake boats were reported to have grounded. A number of thunderstorms occurred also in other portions of the district, and fogs in a few instances occasioned some delay to navigation.

The following table summarizes the chief features of meteorological interest in the various portions of the district:

Portions of States.	Mean temperature.		Mean daily range.		Mean precipitation.		Greatest precipitation in 24 hours.		Mean snowfall.	With 0.01 inch or more.	Number of days.			Prevailing wind direction.
	Mean	Departure.	Mean	Departure.	Mean	Departure.	Mean	With 0.01 inch or more.			Clear.	Partly cloudy.	Cloudy.	
Minnesota.....	45.8	+1.4	18.7	0.65	-2.24	0.53	T.	6	15	8	8	8	sw.	
Wisconsin.....	49.9	+1.7	17.2	2.18	-0.06	1.58	T.	6	19	4	8	8	sw.	
Illinois.....	55.2	+2.6	13.5	4.28	+1.85	2.69	0	8	17	6	8	8	sw.	
Indiana.....	53.7	-0.1	22.6	2.74	+0.58	1.40	0	8	17	5	9	9	sw.	
Upper Michigan	47.5	+2.6	21.3	2.32	-0.57	2.00	T.	7	15	7	9	9	sw.	
Lower Michigan	51.5	+1.7	17.4	2.63	+0.05	2.00	0.2	8	16	6	9	9	sw.	
Ohio.....	54.1	+1.6	18.0	2.87	+0.37	2.51	T.	8	17	6	8	8	sw.	
Pennsylvania....	55.5	+2.4	14.0	5.38	+1.58	3.24	0	12	8	10	13	s.	s.	
New York.....	50.8	+2.3	17.2	2.76	-0.58	2.67	T.	11	13	9	9	9	w.	
Vermont.....	49.8	+2.9	19.7	3.70	-0.88	3.00	0	12	12	9	10	10	s.	

TEMPERATURE.

The mean temperature was above normal generally by from 1.5° to 3° , the greatest departures occurring over Upper Michigan and the Champlain Valley. While temperatures from day to day showed a rapid alternation between cool and warm periods, there were no unusually severe conditions present in any portion of the district, the daily departures seldom exceeding the normal by 15° , nor falling more than 10° below. The 5th and 6th

marked the time of greatest heat, and on these days temperatures of over 80° were general. The coldest weather occurred on the 23d and 24th over the western sections, on the 16th in the region of the lower lakes, and on the 29th in the extreme east, although a number of stations recorded their minimum temperatures on other dates. Killing frosts or freezing temperatures occurred generally during the periods of lowest temperatures, considerably later than the average, although favored localities near the southern and eastern lake shores escaped, and in some instances vegetation was still green at the close of the month.

The absolute range for the entire district was 73° , from a maximum of 88° to a minimum of 15° .

PRECIPITATION.

The distribution of precipitation was irregular in amount, the southwestern and extreme eastern sections receiving more than the normal rainfall for the month, while in much of the New York State portion, the northern portions of Lower Michigan and Wisconsin, and the region of Lake Superior, there was a considerable deficiency. In point of time, however, the distribution was much more even, periods of general precipitation covering the 3d-4th, 8-12th, 18th-22d (extending to the 26th from the lower lakes eastward), and the 28th-31st. Over the western sections by far the larger proportion of the monthly amount fell during the second and third periods mentioned, while over northeastern Ohio and the New York and Vermont portions of the district, one-half or more of the total fall occurred during the 18-26th. During the 22d-24th rains were exceptionally heavy in the eastern counties of Ohio. Some of the small streams in Ashtabula County overflowed and caused considerable damage; the interurban railway tracks in the vicinity of Jefferson were flooded, and 50 sheep were drowned near Kelloggsville. In the Champlain Valley the heavy rainfall of the latter portion of the month swelled the rivers and occasioned some minor damage, but served also to saturate the soil and furnished a needed supply of ground water for springs and streams. The surface of Lake Champlain rose 2 feet 6 inches above the low water mark for this year, which occurred on September 15, being then 1 foot 5 inches above the previous low-water mark. On the 26th the intervalle north of the city of Burlington, Vt., was flooded by the rains, and on the same date the water in the gorge of the Winooski River rose more than $5\frac{1}{2}$ feet.

But little snow fell in any portion of the Lake region during October, 1912, the only appreciable falls being at a few stations in Michigan and in the highlands of New York State.

LAKE LEVELS, OCTOBER, 1912.

The following data are from the report of the United States Lake Survey:

	Lake Superior.	Lakes Michigan-Huron.	Lake Erie.	Lake Ontario.
Above tidewater at New York.....	Feet. 602.59	Feet. 580.50	Feet. 572.12	Feet. 246.17
Above or below:				
Stage of September, 1912.....	+ 0.06	- 0.17	- 0.36	- 0.21
Stage of October, 1911.....	+ 0.41	+ 0.92	+ 0.59	+ 1.55
Mean stage October last ten years.....	- 0.19	- 0.14	- 0.05	+ 0.30
Highest recorded stage.....	- 0.97	- 2.56	- 1.58	- 1.64
Lowest recorded stage.....	+ 1.01	+ 1.02	+ 1.32	+ 2.50
Probable change during November.....	- 0.20	- 0.30	- 0.30	- 0.30

WATER POWER PROJECTS ON THE ESCANABA RIVER.

By V. E. JAKL, Observer.

Of the many water power possibilities in the Upper Peninsula of Michigan, one of the best examples is to be found on the Escanaba River, near Flat Rock, Mich.,

where the Escanaba Traction Co. has recently completed, at a cost of \$200,000, a power dam and pulp mill that have been under construction since the spring of 1911.

The completion of this project marks another step in the campaign of water power development on the Escanaba River that local capital has been pursuing during the past four years, and the success that has attended these undertakings is attested by the low cost of electric current now furnished to the municipal lighting and power systems of Escanaba and Gladstone, Mich.

There are two dams in operation, about a mile and a half apart, having heads of 20 feet and 32 feet, respectively, and developing a maximum horsepower estimated at 4,500. The power is converted principally into electric current, part of which is utilized by the traction company in the operation of its street and interurban railway systems; while surplus power is conducted, by direct mechanical connection, to the pulp mill.

Up to date \$320,000 has been expended on these projects, and in anticipation of a rapidly increasing demand for current present plans provide for the construction of another dam on a site a mile farther up the river.

TABLE 1.—Climatological data for October, 1912. District No. 4, Lake Region.

Stations.	Counties.	Elevation, feet.	Length of record, years	Temperature, in degrees Fahrenheit.								Precipitation, in inches.								Sky.	Prevailing wind direction.	Observers.		
				Mean.				Departure from the normal.				Total.				Departure from the normal.				Total snowfall, unmeted.				
				Highest.	Date.	Lowest.	Date.	Greatest daily range.				Greatest in 24 hours.				Greatest in 24 hours.				Number of clear days.	Number of partly cloudy days.	Number of cloudy days.		
Minnesota.																								
Cloquet.....	Carlton.....	800	1	44.8	-	82	5	17	23	50	0.62	-	0.32	0.2	7	20	1	10	w.	w.	w.	W. H. Kenety.		
Duluth.....	St. Louis.....	1,133	41	46.6	+ 1.4	80	5	25	31	36	0.68	- 2.08	0.52	T.	8	11	10	10	sw.	U. S. Weather Bureau.				
Floodwood.....	do.....	1,257	6	45.4	-	85	5	19	23	49	0.90	-	0.52	0	5	19	4	8	w.	w.	w.	M. H. Schussler.		
Stephens Mine.....	Lake.....	1,500	5	46.6	+ 1.5	77	5	20	31	39	0.58	- 2.39	0.30	T.	4	7	22	2	sw.	G. W. Watts.		Oliver Iron Mining Co.		
Two Harbors.....	St. Louis.....	614	18	46.6	-	82	5	22	25	35	0.45	- 2.25	0.21	0	4	18	2	11	sw.	sw.	sw.	Oliver Iron Mining Co.		
Virginia.....		1,434	18																					
Wisconsin.																								
Appleton.....	Outagamie.....	795	11	51.0	+ 2.1	78	6	28	24	29	1.79	+ 0.04	0.70	0	8	22	2	7	s.	s.	s.	Wm. O. Thiede.		
Ashland.....	Ashland.....	615	21	49.2	+ 1.4	88	5	20	23	43	1.14	- 1.70	0.74	0	4	19	8	4	sw.	Sam Wheeler.				
Bayfield.....	Bayfield.....	635	3	50.0	-	83	5	24	31	35*	1.20	-	1.16	0	2	19	0	9	sw.	F. Kern.				
Cecil.....	Shawano.....	804	14	49.2	+ 1.6	78	5	24	27	41	2.72	+ 0.31	0.90	0	8	21	6	4	sw.	Louis W. Schmidt.				
Conneaut.....	Bayfield.....	640	0	48.4	-	80	5	19	23	40	0.93	-	0.56	0	5	16	8	7	sw.	Reed Fruit Co.				
Crandon.....	Forest.....	1,060	17	46.8	+ 2.1	76	5	18	31	36	1.61	- 0.76	1.02	0	6	17	4	10	sw.	Frank Shoemaker.				
Florence.....	Fond du Lac.....	1,293	23	47.6	+ 3.4	79	6	19	31	36*	1.76	- 0.84	1.30	0	2	18	2	11	nw.	Fred S. Evans.				
Fond du Lac.....	Fond du Lac.....	800	26	50.2	+ 1.7	81	6	22	24	43	2.23	+ 0.18	0.80	0	7	21	3	6	s.	Edward A. Seeley.		Jerry Parkinson.		
Grand River Locks.....	Marquette.....	770	16	50.8	-	79	6	23	24	36	1.30	- 1.68	0.43	0	7	22	3	6	s.	U. S. Weather Bureau.				
Green Bay.....	Brown.....	617	26	50.2	+ 3.2	78	5	29	31	47	2.19	- 0.18	0.98	0	9	15	6	10	sw.	No. Hydro-Elec. Power Co.				
High Falls.....	Marinette.....	1,125	0	49.0	-	80	5	17	31	43	2.85	-	1.00	0	8	21	1	9	w.	Winfield E. Tripp.				
Iron River.....	Bayfield.....	1,090	3	48.4	-	87	5	20	23	40	1.32	-	0.70	0	7	21	1	9	s.	Eugene V. Kimball.				
Keweenaw.....	Keweenaw.....	590	3	50.9	-	76	6	30	24	28	1.81	-	0.80	0	6	18	5	8	sw.	Miss Johanna Lups.				
Manitowoc.....	Manitowoc.....	616	61	49.8	+ 1.5	78	6	29	24	32	1.65	- 0.89	0.90	0	5	16	6	9	sw.	Geo. T. Allanson.				
Menasha.....	Winnebago.....	764	15	50.0	-	79	6	26	24	29	2.88	-	1.28	0	5	21	4	6	sw.	Wm. K. Smith.				
Menomonee Falls.....	Waukesha.....	842	3	50.0	-	79	6	26	24	29	2.88	-	1.28	0	7	18	6	7	sw.	Arthur H. Christman.				
Milwaukee.....	Milwaukee.....	681	42	53.0	+ 2.8	83	6	36	30	32	3.42	+ 1.03	1.41	0	7	18	5	8	sw.	U. S. Weather Bureau.				
New London.....	Outagamie.....	762	16	49.6	+ 0.9	78	5	24	24	34	2.21	- 0.24	0.90	0	6	19	4	8	nw.	August H. Pape.				
Oconto.....	Oconto.....	590	21	50.0	+ 1.5	80	6	25	31	34	2.05	- 0.19	1.00	0	6	18	7	6	w.	Wm. K. Smith.				
Oshkosh.....	Winnebago.....	744	23	49.5	+ 0.1	79	6	24	24	42	2.43	+ 0.30	0.85	0	5	19	8	4	sw.	Evan Vincent.				
Pine River.....	Waushara.....	900	17	50.2	+ 1.4	79	5	23	24	33	1.88	- 0.37	0.54	0	7	19	5	7	sw.	Geo. H. Carpenter.				
Plum Island.....	Door.....	588	4	51.3	-	72	6	32	31	21	2.31	-	1.15	0	7	17	0	14	s.	Wm. Robinson.				
Plymouth.....	Sheboygan.....	843	2	50.4	-	79	6	28	31	30	2.31	-	1.03	0	7	21	3	7	sw.	Paul O. Feldrappe.				
Port Washington.....	Ozaukee.....	713	19	51.8	+ 2.4	82	6	31	24	30	3.22	+ 2.27	1.41	0	5	20	2	9	sw.	Richard C. Kann.				
Racine.....	Racine.....	633	15	53.2	+ 0.7	84	6	30	24	32	4.45	+ 2.86	1.00	0	7	21	2	8	sw.	Daniel Davis.				
Ripon.....	Fond du Lac.....	1,031	24	52.4	+ 1.9	80	7	32	24	32	1.83	-	0.68	0	7	19	3	8	s.	Ripon College.				
Sheboygan.....	Sheboygan.....	831	13	52.4	+ 1.9	80	7	32	24	32	2.42	+ 0.03	1.35	0	7	20	4	7	nw.	Louis C. Meyer.				
Sturgeon Bay.....	Door.....	600	13	48.8	+ 1.5	78	6	25	24	33	5.11	-	1.58	T.	7	18	5	8	s.	Adam N. Dier.				
Superior.....	Douglas.....	701	3	46.8	-	77	4	25	31	38	0.85	-	0.62	0	5	15	6	10	sw.	Edward B. Banks.				
Waupaca.....	Waupaca.....	857	17	48.9	+ 0.7	81	5	20	24	44	2.07	- 0.22	0.80	0	7	18	6	7	sw.	James H. Flagg.				
Illinois.																								
Chicago.....	Cook.....	823	42	55.8	+ 2.6	84	6	38	23	23	3.52	+ 0.97	1.11	0	9	17	6	8	sw.	U. S. Weather Bureau.				
Evanston.....	do.....	601	...	54.7	-	83	6	30	24	37	5.16	+ 2.54	2.69	0	9	18	5	8	sw.	City of Evanston.				
Indiana.																								
Auburn.....	De Kalb.....	874	16	50.1	- 0.9	81	6	21	26	40	1.56	- 0.74	0.92	0	4	12	5	11	sw.	Mrs. Josie B. Kuhlman.				
Berne.....	Adams.....	849	3	53.9	-	81	6	31	16	38	1.80	-	0.41	0	10	18	5	8	sw.	Henry M. Reusser.				
Elkhart.....	Elkhart.....	801	10	50.0	-	82	6	32	24	34	2.47	+ 0.05	1.00	0	7	14	9	8	sw.	Dr. Miles Medical Co.				
Fort Wayne.....	Allen.....	856	16	54.0	+ 0.3	82	6	31	24	42	4.25	+ 2.44	1.40	0	10	17	5	9	sw.	U. S. Weather Bureau.				
Hammond.....	Lake.....	598	21	54.2	+ 0.4	87	6	31	24	42	4.25	+ 2.44	1.40	0	4	20	1	10	sw.	Carson W. Whitney.				
Notre Dame.....	Lagrange.....	886	7	56.2	-	86	6	29	24	42	2.80	-	1.00	0	0	10	7	7	sw.	James E. Zook.				
Whiting.....	St. Joseph.....	712	1	53.2	-	82	6	30	24	31	2.48	-	1.35	0	10	17	7	7	sw.	U. S. Weather Bureau.				
Michigan—Upper Peninsula.	Lake.....	606	3	54.2	-	84	6	32	24	34	3.34	-	1.37	0	9	18	4	9	sw.	D. H. Boyd.				
Baraga.....	Baraga.....	623	10	48.6	-	88	6	22	3	40	1.40	- 1.46	0.30	T.	0	7	14	0	17	w.	D. S. S. & A. Ry.			
Bergland.....	Ontonagon.....	1,300	2	48.6	-	88	6	25	31	36	2.21	-	1.65	T.	4	15	2	14	s.	Frank McMonigal.				
Blaney.....	Schoolcraft.....	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E. S. Grierson.				
Calumet.....	Houghton.....	1,246	24	47.2	+ 3.3	82	5	30	24	30	2.03	- 0.99	1.21	T.	6	18	3	10	sw.	Upper Peninsula Exp. Sta.				
Chatham.....	Alger.....	875	11	48.2	+ 3.4	81	6	18	24	47	4.12	+ 1.27	2.00	T.	6	15	7	9	n.	Winthrop S. Dedrick.				
Deer Park.....	Luce.....	610	11	58.5	-	86	6	21	24	37	2.32	-	1.35	1.15	T.	12	12	6	13	w.	John Nolen.			
Detour.....	Chippewa.....	585	11	50.0	+ 7.6	83	5	32	29	33	1.70	- 0.61	1.17	T.	4	13b	6b	10b	w.	U. S. Weather Bureau.				
Eagle Harbor.....	Keweenaw.....	622	13	50.0	+ 7.6	83	5	32	29	33	1.70	- 0.61	1.17	T.	0	8	14	8	9	sw.	W. H. Hatfield.			
Escanaba.....	Delta.....	612	39	47.7	+ 2.6	73	6	25	31	26	2.23	- 0.86	1.13	T.	0	5	21	1	9	n.	Mrs. Lena Truedell.			
Ewen.....	Ontonagon.....	1,147	11	48.9	+ 1.0	75	6	24	20	32	2.55	- 0.34	1.00	T.	8	17	8	6	s.	T. A. Green.				
Grand Marais.....	Alger.....	610	1	48.1	+ 4.1	86	5	30	21	42	2.50	- 0.38	1.50	T.	7	12	11	8	sw.	U. S. Weather Bureau.				
Houghton.....	Houghton.....	663	11	48.1	+ 4.1	86	5	30																

TABLE 1.—Climatological data for October, 1912. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.	Prevailing wind direction.	Observers.		
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmeasured.	Number of rainy days, 0.10 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.		
<i>Michigan—Lower Peninsula.</i>																				
Adrian.....	Lenawee.....	770	34	53.6	+ 1.6	S3	6	29	16†	38	3.00	+ 0.19	0.70	0	8	12	14	5	sw.	H. E. Hubbard.
Allegan.....	Allegan.....	698	21					28	24		3.43	+ 0.03	0.76	0	8	13	6	12	w.	Pere Marquette R. R.
Alma.....	Graffiot.....	750	25	50.2	+ 1.7	79	6	28	16†	34	3.65	+ 0.96	1.06	1.0	9	15	7	9	sw.	P. M. Smith.
Alpena.....	Alpena.....	609	39	49.5	+ 3.6	S3	6	31	16	35	1.72	- 1.71	0.63	T.	10	10	12	9	sw.	U. S. Weather Bureau.
Ann Arbor.....	Washtenaw.....	930	32	52.2	+ 2.3	S8	6	29	31	31	2.59	- 0.07	0.70	0	10	18	1	12	sw.	University of Michigan.
Arbela.....	Tuscola.....	728	16	50.1	+ 1.0	79	6	28	25†	36	2.27	+ 0.18	0.79	T.	9	2	18	11	sw.	Wm. Atkin.
Battle Creek.....	Calhoun.....	822	28	52.7	+ 0.9	S8	6	30	20†	36	2.17	- 0.60	0.50	0	9	21	0	10	sw.	Elmer E. Sager.
Bay City.....	Bay.....	593	16	52.8	+ 2.7	79	7	24	2	37	2.39	- 0.47	0.93	0	5				sw.	Pere Marquette R. R.
Benzonia.....	Benzie.....	832	15	49.0	+ 1.6	78	6	28	24	33	2.20	- 1.02	0.85	0	7	13	11	7	nw.	Wallace Nutting.
Berlin.....	St. Clair.....	23	51.2	+ 2.3	81	6	24	31	46	2.72	- 0.01	0.57	0	9	12	12	7	sw.	R. O. Gould.	
Big Rapids.....	Mecosta.....	906	16	49.7	+ 1.6	79	6	21	24	36	1.40	+ 1.19	2.00	0.2	9	14	8	9	sw.	Stupt. Waterworks.
Blissfield.....	Lenawee.....	687	0	53.4		S8	6	30	16	37	2.12		0.52	0	9	23	3	5	nw.	Harry Watson.
Bloomington.....	Van Buren.....	8	52.9			S8	6	28	24	33	1.74		0.51	0	6	21	1	9	sw.	John M. Haven.
Cadillac.....	Wexford.....	1,293	3	49.2		75	6	28	20	1.96			0.76	0	6	16	4	11	sw.	Cadillac W. & L. Co.
Cassopolis.....	Cass.....	903	11											0	24	0	7	7	w.	Michigan Central R. R.
Charlevoix.....	Charlevoix.....	610	34	52.6	+ 3.2	72	20	30	23	30	1.27	- 1.30	0.69	0	3	14	7	10	w.	Pere Marquette R. R.
Charlotte.....	Eaton.....	8	51.3			80	6	27	20†	38	1.80	0.49	0	7	19	2	10	sw.	City of Charlotte.	
Cheboygan.....	Cheboygan.....	611	22	50.3	+ 2.4	80	6	28	28	34	3.20	+ 0.50	1.50	0	5	12	11	5	w.	E. A. Bouchard.
Clinton.....	Lenawee.....	830	22	53.6	+ 2.7	S8	6	27	16†	46	2.17	- 0.21	0.45	0	7	20	5	6	sw.	David Woodward.
Coldwater.....	Branch.....	984	15	54.6	+ 1.0	81	6	29	24	36	2.42	- 0.75	1.04	0	8	22	0	9	s.	L. S. & M. S. R. R.
Concord.....	Jackson.....	7	52.7			S8	6	29	24	36	3.00		0.80	0	7	17	10	4	sw.	W. N. Armstrong.
Croton.....	Newaygo.....	685	4	51.9*		78	6	28*	16†	36*	3.57		1.15	0	7	14	7	10	w.	Gr. Rap. Musk. Power Co.
Detroit.....	Wayne.....	730	41	53.7	+ 2.0	79	6	35	25	2.17	- 0.21	0.91	0	9	14	6	11	sw.	U. S. Weather Bureau.	
Durand.....	Shiawassee.....	799	4																sw.	H. J. Tobin.
East Tawas.....	Iosco.....	590	15	50.0	+ 1.2	75	4†	27	25	39	2.15	- 0.36	0.80	0	6	18	7	6	sw.	Detroit & Mackinaw Ry.
Eloise.....	Wayne.....	640	15	53.2	+ 0.5	S8	6	29	31	33	2.65	+ 0.19	0.70	0	13	18	2	11	w.	John Gilmore.
Flint.....	Genesee.....	730	23	52.6	+ 3.8	79	4	29	16	34	3.66	+ 1.61	1.80	0	9	17	3	11	w.	William L. Fisher.
Frankfort.....	Benzie.....	589	8	51.1		67	6	34	26	19	2.00		0.98	0	4	15	0	16	sw.	Geo. Morency.
Ganges.....	Allegan.....	665	3	52.0*		78b	6	31†	24	33*	4.87		1.62	0	8	15	7	9	sw.	H. H. Hutchins.
Gaylord.....	Otsego.....	1,367	12																sw.	Michigan Central R. R.
Gladwin.....	Gladwin.....	794	16																s.	Geo. R. Smith.
Grand Haven.....	Ottawa.....	628	31	50.9	+ 0.7	73	6	32	31	31	3.68	+ 1.19	1.09	0.8	8	17	4	10	sw.	U. S. Weather Bureau.
Grand Rapids.....	Kent.....	707	23	52.2	+ 2.1	S8	6	32	24	30	3.97	+ 1.43	1.43	T.	9	12	9	10	s.	Joseph W. Morris.
Grape.....	Monroe.....	625	22	53.2*	+ 1.5	81b	6	29*	31	34	2.11	+ 0.04	0.66	0	12	16	8	7	sw.	Menzo Conklin.
Grass Lake.....	Jackson.....	989	6	53.8		S8	6	28	31	40	2.24		0.77	T.	7	25	0	6	sw.	S. N. Insley.
Grayling.....	Crawford.....	1,147	22	48.2	+ 1.9	S8	6	23	15	38	2.63	+ 0.29	1.23	T.	3	16	6	9	sw.	Michigan Pickle Co.
Greenville.....	Montealim.....	802	0											0	5	18	6	7	sw.	Pere Marquette R. R.
Harbor Beach.....	Huron.....	635	24	53.0	+ 3.7	S8	6	30	16	32	0.95	- 1.72	0.30	0	5	18	6	7	sw.	Pere Marquette R. R.
Harrison.....	Clare.....	1,159	20	51.9	+ 2.4	78	6	30	24	33	2.71	+ 0.55	0.66	0	12	21	2	11	sw.	Do.
Harrisville.....	Kalkaska.....	23	50.4	+ 4.0	79	6	25	16†	41	1.59	- 1.31	0.88	T.	7	10	15	6	sw.	O. L. Giddings.	
Hart.....	Jackson.....	927	15	53.4	+ 0.8	S8	6	29	16†	36	3.10	+ 0.51	0.88	0	10	19	6	6	sw.	City of Jackson.
Kalamazoo.....	Kalamazoo.....	955	36	51.4	+ 0.5	74	21	26	20	35	4.37	+ 1.78	1.25	0	8	17	6	8	sw.	William Bice.
Lansing (Agr. College).....	Ingham.....	820	48	50.4	+ 1.4	S8	6	29	20	35	3.44	+ 1.21	1.16	0.2	10	17	3	11	sw.	Kalamazoo Asylum.
Lansing (Capitol).....	do.....	881	25	51.4	+ 1.9	S8	6	29	24	32	4.68	+ 1.99	1.25	6.0	11	17	1	13	sw.	U. S. Weather Bureau.
Lapeer.....	Lapeer.....	827	13	52.2	+ 1.2	75	1†	32	20	33	1.71	- 0.27	0.52	0	5	4	18	9	sw.	State Board of Health.
Ludington.....	Mason.....	586	14	50.3	- 0.2	71	5	34	24	25	2.01	+ 0.89	1.15	0	9	14	9	8	s.	Michigan Home.
Luther.....	Lake.....	1,028	2	48.8		S8	6	20	24	37	2.53		0.74	T.	10	15	7	9	w.	Pere Marquette R. R.
Mackinaw.....	Cheboygan.....	592	21	49.6	+ 1.8	S8	6	25	13	37	1.10	- 1.90	1.00	0	3	6	6	12	sw.	John W. Nicholson.
Mancelona.....	Antrim.....	1,121	16	48.7	+ 1.5	79	6	19	24	36	1.10	- 2.04	0.50	0	4	22	2	7	w.	G. R. & I. Ry.
Manistee.....	Manistee.....	600	15																sw.	Pere Marquette R. R.
Marshall.....	Calhoun.....	896	0	54.3*		S8	6	28	24†	36	3.63		0.98	0.2	10	19	5	7	sw.	E. B. Stuart.
Midland.....	Midland.....	604	13	52.0	+ 1.9	S8	6	29	31	38	1.10	- 1.37	0.50	0	4	15	5	11	ne.	Pere Marquette R. R.
Morenci.....	Lenawee.....	811	5	53.6		S8	6	29	16	38	2.37		0.61	0	6	19	5	7	sw.	George J. Tripp.
Mount Clemens.....	Macomb.....	615	12	52.6	+ 0.5	S8	6	29	21	37	3.18	+ 1.03	0.85	0	9	21	0	10	sw.	Waterworks.
Mount Pleasant.....	Isabella.....	828	13	45.4	- 3.3	S8	7	25	31	39	2.46	+ 0.40	0.86	4.0	4	15	6	10	sw.	Pere Marquette R. R.
Old Mission.....	Muskegon.....	587	16	50.6	- 0.5	S8	6	30	24	35	3.16	+ 0.70	1.00	0	9	21	4	6	w.	G. R. & I. Ry.
Olivet.....	Grand Traverse.....	858	18	50.4	+ 0.7	S8	6	30	24	29	2.48	- 0.53	0.57	0	10	2	5	6	sw.	E. O. Ladd.
Onver.....	Eaton.....	934	22	50.8	+ 1.9	77	6	30	24	37	3.10	- 0.39	0.57	0	9	20	0	11	w.	G. A. Knapp.
Onaway.....	Arenac.....	616	13																sw.	Detroit & Mackinaw Ry.
Oswego.....	Presque Isle.....	826	9	48.0		S8	7	18	25	40				1	18	12			s.	Do.
Petoskey.....	Shiawassee.....	731	15	53.4	+ 1.6	S8	6	29	24	34	2.77	+ 0.41	0.80	0	14	9	14	8	w.	Owosso Sugar Co.
Plymouth.....	Emmet.....	660	22											6	98	5	5	5	sw.	G. R. & I. Ry.
Pontiac.....	Wayne.....	725	15	54.2	+ 2.9	S8	6	29	16	36	1.93	- 0.92	0.57	0	5	20	5	6	ne.	Pere Marquette R. R.
Pontiac.....	Oakland.....	935	12	52.4	+ 3.2	S8	6	32	31	26	2.99	+ 0.58	0.73	0	10	17	5	9	sw.	Fred W. Shaw.
Port Austin.....	Huron.....	618	15	51.0	+ 0.3	79	6	25	16†	37	1.61	- 0.77	0.48	0	8	15	5	11	s.	Pere Marquette R. R.
Port Huron.....	St. Clair.....	639	37	51.6	+ 2.1	S8	7	25	16	30	2.85	+ 0.12	0.81	0	10	19	11	9	sw.	U. S.

TABLE 1.—Climatological data for October, 1912. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.				Precipitation, in inches.				Sky.				Prevailing wind direction.	Observers.			
				Mean.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Greatest in 24 hours.	Total snowfall, unmeted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.				
Ohio—Continued.																				
Bowling Green.....	Wood.....	670	31	53.8	+ 1.5	83	6	28	16	33	2.50	— 0.06	1.10	0	7	21	4	6	sw.	G. C. Houskeeper.
Bucyrus.....	Crawford.....	1,000	18	54.4	+ 2.8	83	11	28	16†	38	3.12	+ 0.27	0.85	0	6	17	4	10	sw.	James R. Hopley.
Cleveland (1).....	Cuyahoga.....	762	41	55.8	+ 2.7	81	11	37	16	29	3.16	+ 0.43	1.28	0	9	12	5	14	se.	U. S. Weather Bureau.
Cleveland (2).....	do.....	754	15	54.8	+ 1.8	81	11	34	16	32	3.41	+ 0.49	0.95	0	10	18	2	11	se.	Rev. F. L. Odenthal, S. J.
Conneaut.....	Ashland.....	675	22	54.9	+ 1.8	81	6	33	16	35	5.77	—	2.20	0	11	14	4	13	sw.	E. L. Ransom.
Findlay.....	Hancock.....	776	23	54.4	+ 1.7	83	6	27	16	43	2.39	+ 0.27	0.75	0	8	21	5	sw.	Dr. E. A. Moser.	
Freemont.....	Sandusky.....	628	10	55.2	+ 2.3	83	11	32	16	39	2.69	+ 0.13	0.85	0	6	21	3	7	sw.	E. Stanley Thomas.
Hedges.....	Paulding.....	725	18	53.2*	+ 0.7	86 ^a	12	26 ^b	15	41*	1.47	+ 0.70	0.55	0	4	18	10	3	sw.	Charles Stutzman.
Hillhouse.....	Lake.....	997	19	53.6	+ 2.0	80	11	29	16†	32	4.00	+ 0.19	1.25	0	10	16	9	6	sw.	J. W. Doncaster.
Hiram.....	Portage.....	1,260	32	54.4	+ 2.6	80	11	33	16	32	5.60	+ 0.28	2.51	0	9	13	11	7	sw.	Prof. G. H. Colton.
Hudson.....	Summit.....	1,123	51	55.0	+ 3.5	80	11	32	16	31	3.78	+ 1.03	1.38	0	8	14	12	5	sw.	Dr. W. I. Chamberlain.
Lima.....	Allen.....	875	13	54.2	+ 1.4	80	6†	31	16†	35	2.31	+ 0.05	0.60	0	9	22	1	8	s.	Miss Ollie DeLong.
Medina.....	Medina.....	944	24	54.0	+ 1.8	82	11	27	16	35	2.13	+ 0.27	1.01	0	6	20	9	9	s.	F. W. Clark.
Montpelier.....	Williams.....	880	20	53.9	+ 2.8	83	6	29	16†	41	2.55	+ 0.30	0.93	0	7	22	0	9	w.	G. L. Laser.
Napoleon.....	Henry.....	680	25	52.6	+ 0.4	85	6	29	15†	35	3.50	+ 1.54	0.63	0	7	21	2	8	nw.	A. C. Senter.
New Bremen.....	Auglaize.....	1,038	19	53.9	+ 0.1	82	6†	32	16†	33	3.14	+ 1.23	1.55	0	7	19	5	7	sw.	Miss Lillian Grothaus.
North Royalton.....	Cuyahoga.....	1,006	19	54.0	+ 1.1	80	6†	32	16	31	3.53	+ 1.08	1.20	0	7	16	9	6	sw.	W. S. Edgerton.
Norwalk.....	Huron.....	719	26	55.2	+ 2.3	84	6†	28	16	35	3.15	+ 0.89	0.70	0	10	6	17	8	w.	Giles R. Gregory.
Oberlin.....	Lorain.....	855	37	53.7	+ 1.9	83	11	28	16	39	2.47	+ 0.02	1.00	0	8	17	5	9	s.	Prof. F. F. Jewett.
Ottawa.....	Putnam.....	720	19	53.0	+ 0.5	82	11	29	16	46	1.54	+ 0.46	0.38	0	5	14	9	8	nw.	Prof. J. T. Maidlow.
Sandusky.....	Erie.....	629	35	55.4	+ 1.5	81	6	38	16	31	3.12	+ 0.69	1.26	0	9	10	10	11	sw.	U. S. Weather Bureau.
Tiffin.....	Seneca.....	775	30	53.1	+ 1.0	78	9	31	26	32	2.38	+ 0.13	0.82	0	9	22	4	5	sw.	Prof. T. H. Sonnedecker.
Toledo.....	Lucas.....	789	41	55.2	+ 2.6	81	6	35	24	30	1.51	+ 0.75	0.42	0	8	19	4	8	sw.	U. S. Weather Bureau.
Upper Sandusky.....	Wyandot.....	854	29	52.9	+ 0.3	80 ^b	6†	29	16	35 ^b	2.48	+ 0.23	1.10	0	4	15	6	10	sw.	Robert E. Tracht.
Vickery.....	Sandusky.....	588	19	53.9	+ 1.1	84	6	29	16	41	3.62	+ 1.25	1.06	0	10	17	7	7	s.	John W. Barr.
Wapakoneta.....	Auglaize.....	898	52.9	.....	80	9	30	24 ^b	30	2.56	.....	0.68	T.	9	18	8	5	s.	Dr. William Kayser.	
Wauseon.....	Fulton.....	780	40	52.6	+ 1.6	84	6	28	16	41	2.41	+ 0.02	0.75	0	11	15	8	8	s.	Thomas Mikesell.
Wyecife.....	Lake.....	740	.....	.....	.....	.....	.....	.....	.....	2.21	.....	0.64	0	8	12	8	11	s.	C. M. Richardson.	
Pennsylvania.																				
Eric.....	Erie.....	658	39	55.5	+ 2.4	77	6	39	16	23	5.38	+ 1.58	3.24	0	12	8	10	13	s.	U. S. Weather Bureau.
New York.																				
Adams Center.....	Jefferson.....	540	21	53.4	+ 5.9	79	12	30	28	32	2.46	+ 1.97	0.47	T.	17	11	13	7	sw.	A. E. Cooley.
Angelica.....	Allegany.....	1,340	29	47.8	+ 1.0	74	11†	22	27	36	2.81	+ 0.20	0.81	0	10	3	11	17	w.	Charles P. Arnold.
Appleton.....	Niagara.....	270	21	53.1	+ 3.1	79	6	30	16	35	3.92	+ 1.02	2.00	0	10	13	8	5	sw.	H. A. Van Wagoner.
Auburn.....	Cayuga.....	715	43	52.4	+ 2.7	79	12	29	16	30	2.41	+ 1.04	0.42	0	11	19	7	5	nw.	A. H. Underwood.
Avon.....	Livingston.....	585	17	52.4	+ 2.5	79	6	29	16	35	1.19	+ 1.36	0.66	0	6	4	15	12	sw.	W. G. Markham.
Blue Mountain Lake.....	Hamilton.....	1,750	12	.....	.....	.....	.....	.....	.....	6.02	+ 1.99	0.75	T.	15	8	7	16	w.	B. F. Merwin.	
Brockport.....	Monroe.....	537	16	52.7	+ 1.8	76	6	29	16	32	1.90	+ 1.12	0.42	0	11	6	18	7	w.	W. H. Lennon.
Buffalo.....	Erie.....	767	61	53.6	+ 2.1	73	5	36	16	26	4.25	+ 0.72	2.36	0	14	8	13	10	sw.	U. S. Weather Bureau.
Canton.....	St. Lawrence.....	448	18	49.5	+ 2.3	79	12	25	16	36	2.33	+ 1.01	0.94	0	13	15	6	10	sw.	Do.
Cape Vincent.....	Jefferson.....	246	7	51.6	+ 2.6	68	7	27	29	30	1.64	+ 1.08	0.48	0	9	15	6	10	n.	J. Harry Grapotte.
Chazy.....	Clinton.....	151	12	50.8	+ 2.6	68	7	27	29	30	1.64	+ 1.08	0.48	0	9	15	6	10	sw.	W. R. North.
Chestnut Lawn.....	Wyoming.....	1,090	0	52.1	.....	79	6	28	16	36	1.79	.....	0.56	0	10	12	10	9	sw.	Charles Peterson.
Dannemora.....	Clinton.....	1,490	7	49.6	.....	73	6	26	16	25	3.17	.....	0.92	T.	12	6	13	w.	Dr. W. N. Thayer.	
Elba.....	Genesee.....	500	13	50.0	+ 0.2	74	12	28	16	34	1.89	+ 0.88	0.61	0	8	17	7	7	sw.	Joseph S. Wilford.
Fayetteville.....	Onondaga.....	530	13	53.5	+ 2.8	86	6	26	16	31	2.84	+ 0.56	0.86	0	8	15	5	11	nw.	Dana H. Wells.
Gabriels.....	Franklin.....	1,729	10	47.2	.....	75	5†	18	16	40	2.20	.....	0.90	T.	13	15	4	12	w.	Gabriel Sanitarium.
Harkness.....	Clinton.....	622	10	51.6	+ 4.4	78	6†	28	16	36	2.37	+ 0.12	0.99	0	11	21	2	8	w.	J. W. Harkness.
Hemlock Lake.....	Livingston.....	900	14	52.8	+ 1.8	74	12	32	16	28	1.82	+ 0.69	0.74	T.	9	14	9	8	sw.	Bernard P. McGrady.
Hunt.....	do.....	1,321	13	51.2	+ 0.4	80	5†	26	16	35	1.84	+ 1.09	0.80	0	5	9	15	7	sw.	W. S. Barager.
Ithaca.....	Tompkins.....	928	34	52.4	+ 2.9	80	6	33	16	47	1.86	+ 1.31	0.94	T.	8	11	6	14	nw.	U. S. Weather Bureau.
Keene Valley.....	Essex.....	1,000	14	.....	.....	.....	.....	.....	.....	4.39	+ 0.92	0.96	0	11	17	4	10	sw.	E. R. Wells.	
King Ferry.....	Cayuga.....	12	51.8	+ 2.2	80	6†	30	16†	39	5.01	+ 1.52	2.67	0	9	15	5	11	w.	Lucius A. Goodey.	
Lake George.....	Warren.....	350	15	51.8	+ 2.2	80	6†	30	16†	37	5.01	+ 1.52	2.67	0	9	14	11	6	s.	Charles Forsell.
Lake Placid Club.....	Essex.....	1,864	4	42.3	.....	68	11	21	16†	37	2.59	.....	1.11	0.5	11	14	12	5	w.	Henry van Hoevenberg.
Lauterbrunnen.....	Wyoming.....	9	51.4	.....	79	6	28	16	37	1.89	.....	0.59	0	10	10	11	10	sw.	James O. Howard.	
Lockport.....	Niagara.....	520	25	52.5	+ 1.6	75	5†	32	16	31	3.63	+ 0.98	1.73	0	10	12	10	9	sw.	Robert N. Clark.
Lowville.....	Lewis.....	900	45	50.4	+ 4.2	79	6	25	16	47	3.38	+ 1.32	0.83	0	14	14	13	4	w.	Prof. W. F. H. Breeze.
Moira.....	Franklin.....	200	12	50.8	+ 2.7	79	12	25	16	36	1.43	+ 1.32	0.55	0	9	14	12	5	w.	C. E. McBride.
Nehasane.....	Hamilton.....	1,750	4	45.4	.....	76	6	21	16	43	3.61	.....	0.67	0.1	17	12	11	8	w.	L. W. Brown.
North Lake.....	Herkimer.....	1,822	11	46.3	.....	75	6†	24	17	37	4.21	.....	0.85	T.	10	15	6	10	sw.	John F. Redmond.
Ogdensburg.....	St. Lawrence.....	175	28	51.9	+ 1.8	73	12	31	16	32	2.77	+ 0.43	0.90	0	9	10	11	10	sw.	State Hospital.
Old forge.....	Herkimer.....	1,733	4	46.2																

TABLE 2.—*Daily precipitation for October, 1912. District No. 4, Lake Region.*

TABLE 2.—*Daily precipitation for October, 1912. District No. 4—Continued.*

TABLE 2.—*Daily precipitation for October, 1912. District No. 4—Continued.*

* Precipitation included in that of the next measurement.

† Separate dates of falls not recorded.

Precipitation for the 24 hours ending on the morning when it is measured.

T. Precipitation is less than 0.01 inch rain or melted snow.

TABLE 3.—Maximum and minimum temperatures for October, 1912. District No. 4, Lake Region.

Date.	Duluth, Minn.		Wisconsin.						Chicago, Ill.		Fort Wayne, Ind.		Upper Michigan.						Lower Michigan.								
			Florence.		Green Bay.		Milwaukee.						Escanaba.		Ewen.		Houghton.		Marquette.		Sault Ste. Marie.		Alpena.		Battle Creek.		Cadillac.
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
1....	55	39	26	64	39	61	43	60	46	66	38	55	36	52	39	48	38	57	38	63	42	59	34	59	34		
2....	78	40	72	69	47	70	50	71	49	70	42	64	41	77	42	77	45	70	38	73	40	66	40	66	40		
3....	68	50	66	56	70	54	59	66	55	67	47	71	50	66	47	67	51	60	61	61	59	47	66	53	66	53	
4....	76	50	73	42	72	48	77	53	77	55	76	46	66	42	77	47	78	48	72	39	75	45	70	47	70	47	
5....	80	56	77	45	78	51	75	60	81	47	65	51	86	51	81	54	76	44	76	77	41	72	43	72	43		
6....	73	40	79	61	77	52	83	51	84	61	82	55	73	47	78	44	85	45	78	49	83	50	80	62	75	47	
7....	57	33	70	39	55	44	58	46	61	49	65	42	58	39	50	40	53	40	49	35	62	38	70	47	62	45	
8....	58	38	57	34	52	39	53	44	54	47	58	37	55	35	62	43	61	41	59	33	61	37	62	45	56	31	
9....	51	43	52	43	54	46	54	48	70	50	74	52	51	42	54	42	51	43	52	42	53	42	49	45	53	34	
10....	50	41	54	39	53	47	53	51	59	56	66	58	55	44	54	43	50	47	50	42	53	42	61	50	53	43	
11....	47	37	55	38	57	47	64	50	71	56	80	59	55	47	52	42	54	44	56	52	70	55	55	38	55	38	
12....	55	31	51	37	60	42	61	45	61	49	74	44	55	42	48	37	52	40	60	42	61	42	71	47	63	39	
13....	59	36	55	35	58	39	60	44	62	46	61	40	58	37	56	43	58	40	54	37	60	41	60	41	55	42	
14....	61	35	61	43	65	43	64	44	63	38	64	44	57	44	57	44	64	46	57	44	64	41	60	38	60	42	
15....	56	32	.....	55	39	54	43	55	50	59	42	51	37	48	37	46	39	42	33	49	35	57	41	60	37	37
16....	70	42	65	29	62	39	64	41	65	46	62	37	56	36	71	37	69	39	59	30	62	31	60	31	57	29	
17....	69	45	71	51	68	50	70	52	72	50	69	42	64	49	75	50	76	54	68	51	73	49	69	41	65	46	
18....	61	37	.....	71	48	69	49	69	52	64	58	71	47	65	44	73	47	72	45	69	50	65	53	63	52	
19....	50	34	63	39	54	40	56	43	57	43	62	41	52	40	46	36	49	38	50	40	56	42	63	43	59	43	
20....	55	40	55	29	55	38	56	43	63	46	60	34	52	40	57	35	55	38	53	32	53	33	59	30	55	28	
21....	45	32	49	41	53	44	64	49	72	49	73	40	52	43	53	41	53	43	56	48	58	48	72	38	64	46	
22....	45	30	44	32	44	37	50	37	54	44	64	43	44	35	39	36	46	35	49	36	55	37	67	47	59	40	
23....	40	28	47	29	48	31	46	36	46	38	48	35	46	30	45	32	40	31	43	29	42	36	49	40	43	34	
24....	56	36	56	20	55	31	50	36	55	39	54	32	49	27	54	30	53	29	51	27	45	35	51	30	53	29	
25....	58	33	56	35	60	39	53	45	59	46	62	34	56	39	49	38	54	41	50	34	55	32	60	33	56	34	
26....	64	40	81	29	60	36	63	44	63	47	59	37	56	32	55	36	65	42	59	34	60	34	59	34	58	32	
27....	42	36	55	34	51	42	62	45	68	49	65	39	50	37	47	37	44	36	46	33	51	35	63	37	61	42	
28....	46	38	55	36	60	43	65	44	72	53	70	45	54	37	50	38	55	47	47	34	50	36	58	36	58	36	
29....	44	31	58	36	61	38	63	42	65	44	72	46	62	38	59	36	65	38	62	41	62	43	67	50	58	47	
30....	32	28	38	30	44	32	48	36	46	38	53	36	42	28	36	32	39	33	41	35	46	39	59	38	48	37	
31....	38	25	37	19	39	29	43	37	46	41	46	39	38	25	38	30	40	31	39	30	43	31	40	31	40	33	
Mns..	56.0	37.3	58.5°	36.7°	58.8	41.7	70.8	45.3	63.3	48.3	65.3	42.7	56.1	39.3	56.7	39.5	58.2	41.1	55.7	38.1	58.8	40.2	63.5	41.9	58.9	39.5

Date.	Lower Michigan.						Ohio.						Erie, Pa.						New York.						Vermont.			
	Detroit.		Muskegon.		Saginaw, West Side.		Cleveland.		Lima.		Sandusky.		Toledo.		Buffalo.		Canton.		Rochester.		Syracuse.		Burling- ton.		North- field.			
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
1....	61	43	59	41	63	38	56	46	64	41	58	42	64	42	57	49	54	46	50	32	52	44	51	40	50	39	52	38
2....	68	47	66	41	69	39	65	45	68	39	69	44	70	46	64	45	62	44	55	29	63	39	51	38	50	35	69	35
3....	63	50	62	55	58	48	71	49	71	42	70	47	68	47	70	54	66	55	67	50	69	51	67	47	63	43	63	43
4....	74	51	70	51	75	49	68	58	74	46	74	54	77	49	67	56	66	57	72	51	65	59	68	51	63	43	74	36
5....	76	55	74	45	78	45	73	52	76	44	75	54	79	58	70	51	73	55	72	48	75	51	73	44	74	36	74	36
6....	79	58	80	52	81	52	79	53	80	50	81	56	81	57	77	54	72	57	75	49	78	50	77	50	80	35	74	35
7....	64	46	71	50	70	46	66	54	68	50	69	54	66	46	69	49	67	42	69	38	45	50	72	43	73	41	64	41
8....	58	39	55	38	55	37	59	48	59	35	61	42	61	43	58	43	56	40	53	29	53	38	55	39	50	29	58	39
9....	67	49	55	43	55	43	76	53	78	52	75	53	72	52	71	51	63	50	61	41	61	45	58	37	60	28	58	37
10....	61	52	56	42	59	51	65	60	69	60	64	59	63	54	67	56	58	51	52	42	57	52	61	52	56	45	56	42
11....	70	59	59	37	58	52	81	61	80	58	78	60																